

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, 52070 Aachen, Germany

hereby certifies that



Safaricom Kenya

Safaricom Ltd., HQ3, Muguga Green
Off Brookside Drive, off Waiyaki Way
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achieved „**Best in Test**“ with a
Total Score of **733 of 1000**

in the **Mobile Benchmark Kenya 04/2017**.

(Score 290 of 400 in Telephony, Score 443 of 600 in Data Services)



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Head of Network Testing
& Benchmarking
April 2017

Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 Cat4 P3 attenuator	Samsung Galaxy Note4 Cat6 P3 attenuator
Test Cases	<p>Mobile-to-Mobile</p> <p>Mobile-to-Mobile (M2M) Side1 (4G preferred) to Side2 (3G preferred) Side1 (4G preferred) to Side2 (4G preferred) 115 sec call window 70 sec call duration 15 sec call setup timeout Data traffic injection on both sides (100KB) (1 download per call window)</p>	<p>4G CA preferred</p> <p>HTTP DL datastream 10s HTTP UL datastream 10s HTTP 3MB DL fixed file transfer HTTP 1MB UL fixed file transfer Web Browsing - Kepler ETSI Ref. Page 9 Live web pages (56% http, 44% https) YouTube video streaming - 45s</p>
Mobility and Route Types	100% Drivetest 60% in Cities, 18% in Towns and 22% on Roads	
Samples	~ 10.400 per Operator	~ 4000 per Operator
Dates	<p>27 measurement days March 15th – April 14th, 2017</p>	

Testing Route



Score Points and Breakdown

The following table indicates the score points achieved by the networks under test in the modules “Voice” and “Data Services” as well as the breakdown of achieved points in the geographical categories “Cities”, “Towns” and “Roads”.

Module	Infrastructure	Max.	Safaricom	Operator 2	Operator 3
Voice	Total	400	290	187	211
	Cities	240	81%	57%	61%
	Towns	80	60%	38%	40%
	Roads	80	60%	23%	40%
Data	Total	600	443	172	142
	Cities	360	81%	37%	33%
	Towns	120	73%	16%	11%
	Roads	120	53%	16%	10%
TOTAL		1.000	733	358	354

Shown voice, data and total scores are rounded

The following table indicates the achieved percentage of the maximum score in each of the different infrastructural breakdowns.

Data	Service Group	Max.	Safaricom	Operator 2	Operator 3
Cities	Web Browsing	126	79%	18%	18%
	File Download	72	78%	55%	37%
	File Upload	72	77%	40%	32%
	YouTube	90	90%	46%	50%
Towns	Web Browsing	42	69%	14%	12%
	File Download	24	74%	14%	6%
	File Upload	24	63%	11%	9%
	YouTube	30	84%	24%	13%
Roads	Web Browsing	42	43%	13%	13%
	File Download	24	59%	16%	6%
	File Upload	24	47%	12%	9%
	YouTube	30	67%	23%	12%

Voice KPI Overview

The following table indicates the achieved values of all networks under test in each of the relevant Voice Key Performance Indicators (KPIs) for the geographical categories “Cities” and “Towns and Roads”.

Voice M2M	Kpi Name	Unit	Safaricom	Operator 2	Operator 3
Cities	Qualified	[%]	97,7	94,0	94,9
	Call Setup Time	[s]	5,3	6,7	7,2
	AVG Speech Quality	[MOS-LQO]	3,6	3,4	3,5
Towns and roads	Qualified	[%]	94,0	90,5	91,3
	Call Setup Time	[s]	5,7	6,7	7,6
	AVG Speech Quality	[MOS-LQO]	3,4	3,4	3,3
Roads	Qualified	[%]	90,8	74,3	86,9
	Call Setup Time	[s]	5,9	7,4	7,4
	AVG Speech Quality	[MOS-LQO]	3,5	3,2	3,0

Data KPI Overview

The following table indicates the achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical categories “Cities”, “Towns” and “Roads”.

Data Cities	Kpi Name	Unit	Safaricom	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	97,9	56,7	73,2
	AVG Session Time	[s]	4,4	7,4	6,6
HTTP static page DL	Qualified	[%]	98,6	90,7	84,3
	AVG Session Time	[s]	1,7	4,3	4,3
HTTP file DL 3MB	Qualified	[%]	99,1	96,8	93,7
	AVG Session Time	[s]	2,3	7,0	14,2
	90% faster than	[kbit/s]	6516	1733	493
	10% faster than	[kbit/s]	39094	13510	10130
HTTP file UL 1MB	Qualified	[%]	98,0	92,5	89,8
	AVG Session Time	[s]	1,5	7,0	6,7
	90% faster than	[kbit/s]	2843	689	560
	10% faster than	[kbit/s]	14706	2947	2735
HTTP DL FDTT 10s	Qualified	[%]	99,3	96,9	95,5
	AVG throughput	[kbit/s]	25718	8224	5658
	90% faster than	[kbit/s]	7907	1950	492
	10% faster than	[kbit/s]	50362	15507	12854
HTTP UL FDTT 10s	Qualified	[%]	98,9	95,6	95,0
	AVG throughput	[kbit/s]	14479	1601	1844
	90% faster than	[kbit/s]	3111	521	469
	10% faster than	[kbit/s]	21622	3275	3337
YouTube	Qualified	[%]	99,5	91,7	95,0
	Start Time	[s]	2,4	6,5	4,9
	Playouts w/o interruptions	[%]	99,9	99,5	98,9
	AVG Resolution	[p]	610,3	456,1	349,4

Data Towns	Kpi Name	Unit	Safaricom	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	95,8	52,7	44,2
	AVG Session Time	[s]	4,5	7,4	7,2
HTTP static page DL	Qualified	[%]	97,3	80,2	55,3
	AVG Session Time	[s]	1,9	4,3	5,0
HTTP file DL 3MB	Qualified	[%]	98,6	88,0	66,8
	AVG Session Time	[s]	2,6	7,9	20,3
	90% faster than	[kbit/s]	5202	1635	484
	10% faster than	[kbit/s]	38685	10574	7696
HTTP file UL 1MB	Qualified	[%]	95,8	76,6	63,8
	AVG Session Time	[s]	2,5	7,8	9,1
	90% faster than	[kbit/s]	1451	579	465
	10% faster than	[kbit/s]	13652	2678	1921
HTTP DL FDTT 10s	Qualified	[%]	98,2	86,2	83,5
	AVG throughput	[kbit/s]	27732	6958	3280
	90% faster than	[kbit/s]	7304	1814	210
	10% faster than	[kbit/s]	55835	12206	8506
HTTP UL FDTT 10s	Qualified	[%]	97,3	84,3	79,5
	AVG throughput	[kbit/s]	11696	1250	1152
	90% faster than	[kbit/s]	1447	252	219
	10% faster than	[kbit/s]	20681	2568	2445
YouTube	Qualified	[%]	98,0	84,9	79,5
	Start Time	[s]	2,5	6,3	6,1
	Playouts w/o interruptions	[%]	99,8	98,4	95,4
	AVG Resolution	[p]	610,9	439,3	308,6

Data Roads	Kpi Name	Unit	Safaricom	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	86,6	32,1	27,2
	AVG Session Time	[s]	4,9	7,5	6,9
HTTP static page DL	Qualified	[%]	87,1	52,9	34,0
	AVG Session Time	[s]	2,9	4,2	4,9
HTTP file DL 3MB	Qualified	[%]	92,7	55,9	42,6
	AVG Session Time	[s]	5,0	8,2	22,8
	90% faster than	[kbit/s]	2549	1510	479
	10% faster than	[kbit/s]	23479	10873	8628
HTTP file UL 1MB	Qualified	[%]	87,4	52,3	40,8
	AVG Session Time	[s]	4,6	7,5	8,9
	90% faster than	[kbit/s]	943	559	476
	10% faster than	[kbit/s]	11398	2905	2156
HTTP DL FDTT 10s	Qualified	[%]	92,8	60,0	65,3
	AVG throughput	[kbit/s]	14672	6362	2590
	90% faster than	[kbit/s]	2574	1197	166
	10% faster than	[kbit/s]	31437	11892	7556
HTTP UL FDTT 10s	Qualified	[%]	91,6	56,5	59,5
	AVG throughput	[kbit/s]	5679	1435	1049
	90% faster than	[kbit/s]	544	251	74
	10% faster than	[kbit/s]	18570	3166	2766
YouTube	Qualified	[%]	92,9	61,1	59,4
	Start Time	[s]	3,0	6,5	6,8
	Playouts w/o interruptions	[%]	99,1	98,8	90,4
	AVG	[p]	499,9	426,0	287,5